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REVIEW ARTICLE

Enhanced recovery programmes in head and neck surgery: systematic review

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Abstract

Objective: To review the literature on enhanced recovery programmes in head and neck surgery.

Method: A systematic review was performed in May 2013.

Results: Thirteen articles discussing enhanced recovery after laryngectomy, neck dissection, major ablative surgery and microvascular reconstruction were identified. Articles on general pre-operative preparation and post-operative care were also reviewed.

Conclusion: Considerable evidence is available supporting enhanced recovery in head and neck surgery that could be of benefit to patients and which surgeons should be aware of.

Key words: Pharyngeal Neoplasms; Tonsillar Neoplasms; Laryngeal Neoplasms; Hypopharyngeal Neoplasms; Surgical Anastomosis; Postoperative Care; Perioperative Care; Aftercare

Introduction

Enhanced recovery programmes or enhanced recovery after surgery strategies are increasingly used in medicine to reduce the length of in-patient stay following surgery.[1,2] Enhanced recovery programmes were first developed in the 1970s, though not fully reported on until 2002.[3] Many such programmes have now been developed, analysed, audited and modified.[4] The literature on enhanced recovery programmes centres overwhelmingly on general surgery and colorectal surgery in particular. The programmes cover most aspects of care, including nutrition, mobilisation, wound care and patient preparation for surgery (Table I).

Enhanced recovery programmes should be safe and promote early self-care and improvement in functional performance following surgery. They may be of particular benefit following head and neck surgery because of the morbidity resulting from the surgery and the general condition of patients who undergo major head and neck surgery for malignant disease. We reviewed the published literature on enhanced recovery programmes in head and neck surgery.

Materials and methods

A systematic review of the published literature was conducted using the Embase© and PubMed© search engines. The search was performed throughout May 2013.

The key words used in the search were: 'enhanced recovery', 'enhanced recovery programmes', 'enhanced recovery after surgery', 'fast-track surgery', 'rehabilitation', 'head and neck surgery', 'otolaryngology', 'oral and maxillofacial surgery', 'laryngectomy', 'free flap surgery', 'glossectomy', 'neck dissection' and 'pharyngectomy'. The term 'thyroid surgery' was excluded because enhanced recovery in this area centres on same-day surgery or day-case surgery rather than on improving patient function after surgery.

Results

A total of 3110 article abstracts were identified; 3081 were rejected because they applied to other surgical specialties. Twenty-nine articles, published between 1994 and 2013, discussed aspects of post-operative care after head and neck surgery (Figure 1). The references of these articles were reviewed and 13 articles were found to relate specifically to enhanced recovery in head and neck surgery (Table II).[5–17]

Sixteen articles were discounted. Four compared different environments for the post-operative monitoring of patients who had undergone head and neck surgery.[18–21] Three described the post-operative monitoring of free tissue flaps.[22–24] One discussed post-operative fluid administration to patients after head and neck surgery.[25] One discussed the critical care aspects of head and neck patients rather than their care,[26] and another discussed the theory of critical care pathways.[27] One discussed surgical complication treatment rather than prevention in head and neck

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TABLE I
TENETS OF ENHANCED RECOVERY PROGRAMMES

Pre-operative optimisation of patient
Surgical complication prevention
Minimising patient's stress response to surgery
Rehabilitation to return patient's normal function

reconstruction.[28] One discussed the impact of patient co-morbidity on laryngeal cancer outcomes, rather than improving patient outcomes.[29] One article reviewed the need for universal post-operative care in intensive therapy units.[30] One discussed the salvage of failed free flaps in head and neck reconstruction.[31] One discussed the length of hospital stay for patients who had undergone free flap reconstruction of the head and neck in general terms.[32] One article was actually a review of another article on the need for intensive care admission after major head and neck surgery.[33]

Discussion

The use of enhanced recovery programmes is now established in surgery, but no accepted definition has yet been formulated describing their role or structure. One suitable definition has been provided by Hall *et al*.; these authors state that enhanced recovery programmes 'represent multimodal strategies that include patient education, optimal analgesic relief, stress reduction with regional anaesthesia, focused nursing and early mobilisation to augment the rapid return to functional recovery'.[1] Similarly, Rawlinson *et al*. described them as 'protocol(s) … reducing complication rates following surgery and the acceleration of recovery'.[2]

A recent review by Bianchini *et al*. revealed that no articles on programmes described as enhanced recovery programmes or enhanced recovery after surgery strategies that related to head and neck surgery had been published.[34] However, programmes and practices meeting the two aforementioned definitions have been published. Such programmes tend not to be identified as enhanced recovery programmes or enhanced recovery after surgery strategies because of the relatively new formal concept of enhanced recovery programmes in surgery. Additionally, the specialties that usually manage head and neck cancer patients (e.g. ENT, oral and maxillofacial surgery, and plastic surgery) manage the majority of their elective surgical cases on a day-case or same-day surgery basis, and so traditionally have little need for enhanced recovery programmes. This may also explain the lack of identified enhanced recovery programme research in this area.

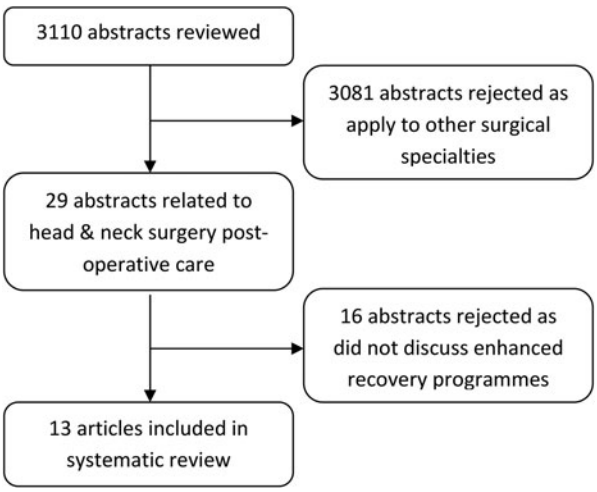

FIG. 1
Enhanced recovery programme review method.

Enhanced recovery programme publications related to head and neck surgery fall into two broad categories. The first category centres on early discharge from hospital following surgery using clinical care pathways. Clinical care pathways (initially referred to as 'critical pathways') were devised in the late 1980s to reduce the costs of healthcare.[35,36] Such pathways are defined as a 'sequence for standardized, interdisciplinary processes or critical events that must occur for a particular case type to move the patient toward the desired outcomes within a defined period of time'.[27] Judging from their definitions, enhanced recovery programmes can be distinguished from clinical care pathways, the latter of which aim to reduce the costs of care rather than encourage faster recovery, although both aim to achieve early discharge from hospital. Five clinical care pathways were identified that facilitated early recovery and discharge following surgery; these are detailed in Table II.

The second category centres on the safety of ward care without the need for intensive care monitoring. Seven articles that analysed the need for intensive monitoring after head and neck surgery were identified. Such care programmes are similar to enhanced recovery programmes in limiting unnecessary interventions. Work published in this area during the late 1990s and 2000s relating to the unnecessary care of head and neck patients in intensive care units can be viewed as a forerunner to the use of enhanced recovery programmes in head and neck surgery.

Intensive care unit admission may be required following head and neck surgery to monitor a patient's airway, and after free tissue transfer surgery with microvascular anastomosis in order to monitor flap viability and perfusion.[19] Intensive care unit admission allows optimal blood pressure control and relative immobilisation to limit shearing forces on microvascular anastomoses.[21] Intensive care unit monitoring may also be required based on the patient's general state of health.[20]

There can be disadvantages to intensive care unit admission though. Hypotension can result from sedation and analgesia, compromising perfusion of tissue flaps, whilst prolonged ventilation can lead to atelectasis and pneumonia development.[21] Intensive care unit admission after surgery also distances the principal

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TABLE II
LIST OF ENHANCED RECOVERY PROGRAMMES AND CLINICAL CARE PATHWAYS

Study	Year	Design	Pts (*n*)	Intervention & description
Jensen *et al.*[5]	1995	Cohort	104	Retrospective review found that central venous monitoring was not required in head & neck surgery. Presence of a central line did not alter intra-op fluid management
Crosher *et al.*[6]	1997	Cohort	51	Tracheostomy was not routinely performed on patients undergoing tumour resection & neck dissection. No increase in chest infections or discharge delays were noted
Husbands *et al.*[7]	1999	Case–control	43	Early post-op physical therapy with aggressive self-care protocols to ensure discharge at day 8 after surgery *vs* no discharge protocol. Day 1 – mobilisation with assistance; day 3 – tracheostomy & gastrostomy care teaching; day 5 – tracheostomy tube downsizing; day 7 – tracheostomy tube removal; day 8 – discharge. No readmission rate difference between 2 groups
Hanna *et al.*[8]	1999	Case–control	15	Early ambulation, enteral feeding & patient-led wound care, with post-op recovery in a recovery room rather than ICU for laryngectomy patients. Speech & language therapy out of hospital. Hospital stay length reduced by 2.4 days (30%) on average. No difference in readmission rate
Godden *et al.*[9]	1999	Case–control	44	Patients nursed on general head & neck ward *vs* those nursed in ICU after tumour resection with reconstruction & radical neck dissection. No difference in post-op morbidity
Chen *et al.*[10]	2000	Case–control	30	Enhanced recovery programme *vs* no programme in patients undergoing unilateral neck dissection. Day 0 – sitting out & mobilising to bathroom; day 1 – full mobilisation, & full diet with wound & drain care teaching; day 2 – drain care teaching or drain removal; discharge. Length of hospital stay reduced to 2 days from a median of 4 days
Gendron *et al.*[11]	2002	Cohort	82	Clinical care pathway for patients undergoing tracheostomy with 1 or more of: total or partial laryngectomy, major intraoral resection, composite resection or neck dissection. Discharge on day 8 after surgery. Day 1 – out of bed, mobilising, with patient education; day 2 – patient education; day 3 – tracheostomy & gastrostomy care teaching. No effect on post-op readmission
To *et al.*[12]	2002	Cohort	268	Assessment of need for ICU admission between major head & neck surgery patients with & without flap reconstruction. No difference in requirement for ICU admission was found
Chalian *et al.*[13]	2002	Case–control	21	Programme to reduce operation time for patients undergoing transcervical, transmandibular & laryngopharyngectomy surgery with radial forearm free flap reconstruction. No effect on post-op morbidity or length of stay
Kagan *et al.*[14]	2002	Cohort	43	Patients aged >65 years had increased length of stay when treated on a clinical care pathway (10 days *vs* 8 days in those aged <65 years)
Bozikov & Arnez[15]	2005	Cohort	101	Free flap success rates increased from 85 to 94.3% when patient diabetes control was optimised & when salvage free flap transfer was avoided
Prasad *et al.*[16]	2006	Cohort	40	Oral feeding on 2nd post-op day in laryngectomy patients did not lead to pharyngocutaneous fistula development
Lansford *et al.*[17]	2008	Cohort	26	Alcohol withdrawal syndrome care protocol in post-op head & neck surgery patients reduced patient violence & transfer time to ICU. Average length of stay increased from 9.6 to 13 days

Pts = patients; op = operative; ICU = intensive care unit

team from the patient, and intensive care unit nursing staff may not be as competently trained in specific aspects of care (e.g. intraoral suctioning and wound care) as nursing staff from the wards of the principal surgical team. Intensive care unit admission bears additional financial costs too, as a result of the increased level of care provided and because of operation cancellations that occur from bed shortages.[19]

Mathew *et al.* reported no difference in tissue flap survival rates between patients admitted to intensive care units and those admitted to high dependency units, where the staff to patient ratio is lower.[19] Bhama *et al.* found no difference in patient outcome when post-operative patients were cared for by intensivist and non-intensivist staff.[20] This is significant as the commonest identified reason in the literature for intensive care unit admission is tissue viability monitoring, rather than respiratory support or the treatment of circulatory failure with inotrope support.[9]

Ryan and Hochman reported that tracheostomy decannulation and commencement of oral feeding could begin safely outside of hospital following major ablative surgery with free flap reconstruction.[32] This allowed their department to reduce the average post-operative hospital stay to 11 days, down from 4 weeks previously; their reported patient readmission rate was 3.2 per cent.

Arshad *et al.* reported no difference in post-operative medical or surgical complications in patients who were cared for in a non-intensive care unit setting (compared with those cared for in an intensive care unit); the only difference was the length of hospital stay, which was reduced for those patients who returned to a general head and neck ward after surgery.[21]

Godden *et al.* reported that intensive care unit admission did not influence the success or failure of free flap transfer surgery, suggesting that tissue flap monitoring could be undertaken safely on a general ward.[9] Tracheostomy may be an unnecessary standard intervention following head and neck oncology surgery, as discussed by Crosher *et al.*[6] These authors suggested that only mandible, floor of mouth and posterior tongue

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resections required this intervention, to avoid flap disturbance and maintain a patent airway (as post-operative tissue swelling may compromise the airway).

Enhanced recovery associated with the comparatively less extensive thyroid surgery has met with limited success. The sole aim of enhanced recovery for thyroid patients appears to be same-day discharge, allowing thyroid surgery to be performed as a day-case operation, for which it was deemed suitable in 2001. The main concern remains post-operative haemorrhage with resulting airway compression. Whilst Chin *et al*. reported that same-day discharge from an ambulatory unit for selected patients was possible,[37] a review article by Doran *et al*. suggested that post-operative haemorrhage is too unpredictable for thyroid surgery to be performed as a day-case operation.[38]

Published articles on enhanced recovery programmes relating to head and neck surgery may assist surgeons and critical care staff in facilitating earlier recovery following surgery. Speedier recovery may improve patient functioning, reduce complications and permit earlier hospital discharge. In practice, informal enhanced recovery programmes probably do exist in most departments undertaking head and neck surgery; these are likely to be based on the lead clinicians' experience, and on the personal preferences of the unit and hospital. Such programmes may well be awaiting audit and publication. The levels of evidence available at the time of our search reach level 2b. Currently though, comparatively little work is available for head and neck surgeons to draw on, especially when compared to the six randomised, controlled trials and seven case-controlled trials of enhanced recovery programmes in colorectal surgery as of 2011.

The issues that need further study include the use of pre-operative enteral and parenteral nutrition in enhancing post-operative recovery, the early removal of surgical drains, the prompt fitting of speech valve prostheses, and the early return of oral feeding.

Enhanced recovery programmes cannot be uniformly applied to all patients undergoing head and neck surgery. Variations within and between programmes will occur based on surgeons' technical abilities, patient's understanding, hospital unit skills and resources, staffing levels and staff experience. However, head and neck surgeons may be able to apply those enhanced recovery programmes already in use to their own practice, and reflect on and apply the work of other surgical specialties to the care of their patients.

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